RECORDED MATERIAL

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Abstract

PURPOSE:To improve an image obtained by an ink jet recording system simulta neously in color developing properties, resistance to light and water, by containing a silica which has been surface-treated with a silane coupling agent.
CONSTITUTION:A silica which has been surface treated with a silane coupling agent is contained in the recorded face of a recorded material, thus remarkably improving the light resistance of an image made of a water-soluble dye. The silane coupling agent having organic functional groups of epoxy, glycidoxy, amino, mercapto, or methacryl is especially preferred. In an ink jet recording system in which a recording image is formed by using a water-soluble ink, a pigment or filler of high surface hydrophobic properties is not preferable for the content of the recorded material because of the decrease in ink absorp tion and the bleeding of dots. The silane coupling agent having organic func tional groups of not quite high hydrophobic properties is desirably used. The silane coupling agent of a simple or mixed condition is used 0.2-15wt% in relation to 100wt% of the silica. The silica is added to the recorded material approximately 5-30pts.wt. in relation to 100pts.wt. of the recorded material.

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Partial translation of Reference 1:

JP Patent Application Disclosure No. 62-178384 - August 5, 1987

Application No. 61-20092 - February 3, 1986

Applicant: Canon K.K., Tokyo, JP

Title: Material for recording

Claims:

1. Material for recording where images are formed using recording liquid containing water-soluble dye, characterized by containing silica which is surface-treated with a silane coupling agent.

2. Material for recording according to Claim 1, wherein the organofunctional group of the silane coupling agent is an epoxy group, glycidoxy group, amino group, mercapto group, or methacryl group.

3. Material for recording according to Claim 1, which is used for inkjet recording.

[Excerpt from the detailed description of the invention]

Example 1:

Surface-treated silica was prepared by dispersing silica in water to obtain a slurry, adding X parts (cf. Table 1) of silane coupling agent per 100 parts of silica, and then drying the

slurry through heat-treatment for 1.5 hours at 105°C.

Using a general free sheet (Ginkan with a basis weight of 60g/m^2, manufactured by Sanyo Kokusaku Pulp K.K.) with a stockigt sizing degree of 35 seconds according to JISP8122 as the substrate, the present material for recording was obtained by coating a coating liquid with the undermentioned composition onto the substrate in a proportion of 10g/m^2 of dry-coating amount using a blade coater, and then drying the same according to a conventional method.

Synthesized silica ・・・・・100 parts
(Syloid74 with specific surface area of 300g/m^2, manufactured by Fuji-Davison Kagaku)
Silane coupling agent・・・・・X parts
Polyvinyl alcohol・・・・・50 parts
(PVA117, manufactured by Kuraray)
Water・・・・・400 parts

Furthermore, for a comparison, a coating liquid comprising silica untreated with silane coupling agent was prepared, and the materials for recording of the comparative examples were produced by coating the free sheet with this coating liquid.

Inkjet recording was performed onto the aforementioned materials for recording using the ink with under mentioned composition and the light resistance of the solid printing part of the obtained images was evaluated.

The light resistance was evaluated by irradiating xenon fade meter for 30 hours (40°C, 65%RH, 55mW/cm^2), and comparing the color difference (ΔEab*) with the unirradiated samples by using a high-speed spectrophotometer of model CA-35 (manufactured

by Murakami Shikisai Gijutsu Kenkyujo). The smaller color difference signifies better light resistance. The result is shown in Table 1.

C.I. hood black 2・・・・・2 parts

Diethylene glycol・・・・・15 parts

Polyethylene glycol・・・・・18 parts

Water・・・・・70 parts

As shown in Table 1, the light resistance of the recorded image obtained by using the present material for recording is greatly improved comparing to those using the comparative examples. Further, the recorded image obtained by the present invention did not show bleeding and the image remained clear even when using water-base ink containing water-soluble dye. Both of the examples and the comparative examples showed good results in color development.

Example 2:

Silica slurry treated with a silane coupling agent was prepared by adding to a slurry of synthetic silica (Nip Seal NS with a specific surface area of 160g/m^2, manufactured by Nippon Silica) silane coupling agent in a proportion of 2 parts per 100 parts of the synthesized silica, heating the slurry while stirring, and then heat-treating the silica for 30 minutes at 90°C.

Using LBKP with a water-filtration degree of 370mlCSF as the material pulp, the aforementioned silica treated with a silane coupling agent was added thereto in a proportion of 30% (dry weight) based on the solid content of the pulp as a loading

material, and cation starch (CATOF, manufactured by Oji National) was further added thereto in a proportion of 0.2% based on the solid content of the pulp as a retention-improving agent, and body paper with a base weight of 70g/m^2 was obtained by using TAPPI standard sheet former.

Coating was applied onto said body paper by using a coating liquid comprising 2% concentration polyvinyl alcohol solution (PVA CST, manufactured by Kuraray) so that the dried coating amount would be 1.2g/m^2 by using a side press apparatus, and then dried according to a conventional method to obtain the present material for recording.

The same coating was applied to a body paper containing silica untreated by a silane coupling agent to obtain the comparative material for recording.

Inkjet recording was performed onto the aforementioned materials for recording using ink with the under mentioned composition, and the light resistance was evaluated according to the same method as in Example 1. The result is shown in Table 2.

C.I. Direct Blue 199 · · · · · 2 parts

Glycerin · · · · · 5 parts

Polyethylene glycol · · · · · 15 parts

Diethylene glycol · · · · · 20 parts

Water · · · · · 58 parts

As shown in Table 2, the light resistance of the images obtained by using the present material for recording was much improved comparing to those using the comparative examples.

[Table 1]

Silane coupling agent	Added amount (X parts)	Light resistance (ΔEab*)	
-	-	24.2	Comparative example
γ-aminopropyltrimethoxysilane (A-1110, Nippon Unicar K.K.)	0.2	18.6	Example
γ-aminopropyltrimethoxysilane (A-1110, Nippon Unicar K.K.)	1	12.3	Example
γ-aminopropyltrimethoxysilane (A-1110, Nippon Unicar K.K.)	5	9.6	Example
γ-aminopropyltrimethoxysilane (A-1110, Nippon Unicar K.K.)	10	8.7	Example
γ-glycidoxypropyltrixysilane (A-187, Nippon Unicar K.K.)	2	12.8	Example
γ-methacryloxypropyltrimethoxysilane (KBM503, Shin-Etsu Kagaku Kogyo)	2	13.5	Example
γ-mercaptopropyltrimethoxysilane (SH6062, Toray)	2	11.3	Example
Vinyltrichlorsilane (KA1003, Shin-Etsch Kagaku Kogyo)	2	13.2	Example
γ-chloropropyltrimethoxysilane (A-143, Nippon Unicar K.K.)	1	14.5	Example

[Table 2]

Silane coupling agent	ΔEab*	
-	14.3	Comparative example
β-(3,4epoxycyclohexyl)-ethyltrimethoxysilane (A-186, Nippon Unicar K.K.)	7.8	Example
γ-aminopropyltriethoxysilane (KBE903, Shin-Etsu Kagaku Kogyo)	6.5	Example
γ-ureidopropyltriethoxysilane (A-1160, Nippon Unicar K.K.)	7.2	Example